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TRANSMITTAL OF APPEAL BRIEF (Large Entity)

Docket No.
DE920000006US1

In Re Application Of: **Barowski et al.**

Application No.	Filing Date	Examiner	Customer No.	Group Art Unit	Confirmation No.
09/864,590	**May 24, 2001**	**Gerstl, Shane F.**	**46369**	**2183**	**2120**

Invention: **UNIVERSAL LOAD ADDRESS/VALUE PREDICTION USING STRIDE-BASED PATTERN HISTORY AND LAST-VALUE PREDICTION IN A TWO-LEVEL TABLE SCHEME (as amended)**

COMMISSIONER FOR PATENTS:

Transmitted herewith in triplicate is the Appeal Brief in this application, with respect to the Notice of Appeal filed on **January 24, 2005**

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Dated: **March 18, 2005**

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Appellants:	Barowski et al.	Group Art Unit: 2183
Serial No.:	09/864,590	Examiner: Gerstl, Shane, F.
Filed:	05/24/2001	Appeal No.:
Title:	UNIVERSAL LOAD ADDRESS/VALUE PREDICTION USING STRIDE-BASED PATTERN HISTORY AND LAST-VALUE PREDICTION IN A TWO-LEVEL TABLE SCHEME (as amended)	

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Brief of Appellants

Dear Sir:

This is an appeal from a final rejection, mailed October 19, 2004, rejecting claims 11-20 of the above-identified application. The Appeal Brief is due within two months from the date the Notice of Appeal was received at the United States Patent and Trademark Office. Since appellants' postcard indicates that the Notice of Appeal was received on January 24, 2005, this Brief is initially due on or before March 24, 2005, and thus, this Appeal Brief is timely filed on

or before March 24, 2005. The Brief is accompanied by a transmittal letter authorizing the charging of appellants' deposit account for payment of the requisite fee set forth in 37 C.F.R. §1.11(c).

Appellants' brief is being filed after the effective date of the final BPAI Rules, September 13, 2004, and, therefore, the format and content of appellants' brief is in compliance with the requirements set forth in 37 CFR §41.37(c). If appellants' brief does not comply with the requirements set forth in 37 CFR §41.37(c), appellants request notification of the reasons for noncompliance and the opportunity to file an amended brief pursuant to 37 CFR §41.37(d).

Real Party in Interest

This application is assigned to International Business Machines Corporation by virtue of an assignment executed by the co-inventors and recorded with the United States Patent and Trademark Office at reel 012146, frame 0772, on August 30, 2001. Therefore, the real party in interest is International Business Machines Corporation.

Related Appeals and Interferences

To the knowledge of the appellants, appellants' undersigned legal representative, and the assignee, there are no other appeals or interferences, which will directly affect or be directly affected by or have a bearing on the Board's decision in the instant appeal.

Status of Claims

This patent application was filed on May 24, 2001 with the U.S. Patent and Trademark Office. As filed, the application included 10 claims, of which 2 were independent claims (i.e., claims 1 and 6).

In an initial Office Action, dated April 7, 2004, claims 1-10 were rejected under 35 U.S.C. 112, second paragraph as being indefinite; claim 1 was rejected under 35 U.S.C. §102(b) as being anticipated by Wang et al. ("Highly Accurate Data Value Prediction Using Hybrid Predictors", IEEE, 1997; hereinafter, "Wang"); and claims 2-10 were rejected under 35 U.S.C. §103(a), as unpatentable over Wang in view of Nakra et al. ("Global Context-Based Value Prediction", IEEE, 1999; hereinafter, "Nakra"). A Response to Office Action with a one-month extension of time was filed on August 3, 2004, in which claims 1-10 were canceled without prejudice and new claims 11-20 were added.

On October 19, 2004, a second and final Office Action was issued, wherein claims 11-15 were rejected under 35 U.S.C. 112, second paragraph as being indefinite; claims 11-20 were rejected under 35 U.S.C. 103(a) as being unpatentable over Wang in view of Nakra. Appellants timely filed a Response to Final Office Action on December 17, 2004, in which claims 11 and 14 were amended responsive to the 35 U.S.C. §112 rejection of claims 11-15 contained in the final Office Action, and claim 20 was canceled without prejudice to address the 37 C.F.R. §1.75(c) claim objection thereto.

Appellants received an Advisory Action and Notice of Non-Compliant Amendment, dated January 13, 2005, which indicated that the Response to Final Office Action filed on December 17, 2004 did not provide a proper status identifier for claim 16. Consequently, no amendment of the claims was effected, and the Response but did not place the application in condition for allowance. A Notice of Appeal to the Board of Patent Appeals and Interferences was timely filed on January 18, 2005 and received on January 24, 2005.

Appellants filed a Corrected Response to Final Office Action with a request for a one-month extension of time on January 25, 2005, after the Notice of Appeal was filed, in which claim 16 was provided with a proper status identifier; claims 11 and 14 were amended responsive to the 35 U.S.C. §112 rejection of claims 11-15 contained in the final Office Action;

and claim 20 was canceled without prejudice to address the 37 C.F.R. §1.75(c) claim objection thereto.

Appellants received an Advisory Action, dated February 11, 2005, which indicated that the proposed claim amendments will be entered but that the amendment after Notice of Appeal did not place the application in condition for allowance.

The status of the claims is as follows:

Claims allowed – None;

Claims objected to – None;

Claims rejected – 11-19; and

Claims canceled – 1-10 and 20.

Appellants are appealing the rejection of claims 11-19.

Status of Amendments

Appellants' proposed amendment to the claims in the Corrected Response to Final Office Action, filed January 25, 2005 will be entered. Hence, the claims as set out in Appendix A include all amendments effectuated by the Corrected Response and by the Response filed on August 3, 2004.

Summary of Claimed Subject Matter

The present invention is directed to a hybrid prediction method (claim 11) and system (claim 16) usable in parallel computing processors for predicting a value to be produced by an anticipated execution of an instruction (paragraphs [0004] and [0027]). The method comprises storing, in a first table (40 in FIG. 4; paragraph [0043]), the following items: a current actual value resulting from a most-recent execution of the instruction (42 in FIG. 4; paragraph [0045]); a current stride determined from the current actual value and a previous actual value produced by a prior execution of the instruction (550 in FIG. 5; paragraph [0064]); and a stride history pattern for the instruction (43 in FIG. 4; paragraph [0046]). The stride history pattern represents a pattern of strides resulting from prior executions of the instruction (paragraph [0046]), wherein strides, including the current stride, of the pattern of strides are stored in a stride field (41a-41d in FIG. 4) of the first table (paragraphs [0045] and [0046]).

The hybrid prediction method of claim 11 also includes selecting a stride (690 in FIG. 6) from the stride field of the first table (paragraphs [0076] - [0077]). The hybrid prediction method of claim 11 further comprises computing a predicted value for the value to be produced by the anticipated execution of the instruction (paragraphs [0048] and [0050]). The computation of a predicted value in accordance with an aspect of the present invention uses the stride from the selecting and the current actual value (690 in FIG. 6; and paragraphs [0048] and [0077]), wherein the predicted value from the computing is equal to a prediction result from one of the following types of predictors: last value prediction, stride-based value prediction, and stride-history-pattern-based value prediction (paragraphs [0027]-[0032]).

The hybrid prediction system (claim 16) comprises the following features: a first table having at least one entry (40 in FIG. 4; paragraph [0043], wherein each entry comprises a current actual value resulting from a most-recent execution of an instruction (42 in FIG. 4; paragraph [0045]), a plurality of stride fields (41a-41d in FIG. 4), and a stride history pattern field (43 in

FIG. 4; paragraphs [0043] and [0046]). The hybrid prediction system also further comprises a pattern history table (44 in FIG. 4) for storing a plurality of counters (45a-45d in FIG. 4) associated with the stride fields of the first table (paragraph [0048]). The pattern history table is arranged to be addressable by a two-table look-up mechanism using the stride history pattern field of the first table to select an entry in the pattern history table (paragraph [0048]). The counters are arranged for being updated according to occurrences of repeated stride patterns (555, 560 and 565 in FIG. 5; paragraph [0067]).

In another aspect of the present invention (claim 14), if an entry for an instruction from the storing step is not found in the first table, the method further comprises initializing a plurality of saturating counters associated with the instruction in a stride pattern history table (510, 530 and 540 in FIG. 5; paragraphs [0056] and [0061]). The counters in the stride pattern history table are initialized such that the predicted value of the result to be produced by instruction execution is equal to the prediction result obtained from last value prediction for the period before a comparison of the saturating counters to a threshold indicates detection of a stride history pattern (paragraphs [0051], [0054]-[0056], and [0059]). In addition, the method includes updating at least one of the plurality of saturating counters upon a subsequent occurrence of the stride history pattern resulting from one or more subsequent executions of the instruction (555, 560, and 565 in FIG. 5; and paragraph [0067]).

In claim 17 the hybrid prediction system is further characterized as having a plurality of stride fields (41a-41d in FIG. 4), wherein the plurality of stride fields is in a range of greater than three and less than seven strides (paragraphs [0034], [0043], and [0079]).

Grounds of Rejection to Be Reviewed On Appeal

1. Whether claims 11-15 are indefinite under 35 U.S.C. 112, second paragraph; and

2. Whether claims 11-19 are rendered obvious under 35 U.S.C. 103(a) to one of ordinary skill in the art by Wang et al. ("Highly Accurate Data Value Prediction Using Hybrid Predictors", IEEE, 1997) in view of Nakra et al. ("Global Context-Based Value Prediction", IEEE, 1999).

Argument

I. Rejection of claims 11-15 under 35 U.S.C. 112, second paragraph

Reversal of the rejection of claims 11-15 under 35 U.S.C. §112, second paragraph, is respectfully requested for the reasons stated below.

Independent claim 11 and dependent claim 14 were rejected as indefinite due to the recitation of the term "essentially equal," which is not defined in the claims. Appellants amended claims 11 and 14 in the Corrected Response after Final Office Action filed January 25, 2005 to strike the word "essentially" from both claim 11 and claim 14. In an Advisory Action mailed on February 11, 2005, the Examiner indicated that these amendments to the claims would be entered. Thus, appellants respectfully submit that the allegedly indefinite language has been removed from claims 11 and 14 and that therefore the rejection under 35 U.S.C. §112, second paragraph has been overcome. Since claims 12, 13, and 15 depend from claim 11, appellants submit that the rejection of claims 12, 13, and 15 is also overcome by the amendment to claim 11 in the Corrected Response after Final Office Action.

For the above reasons, appellants respectfully submit that the rejection of claims 11-15 under 35 U.S.C. §112, second paragraph should be withdrawn, and reversal of the rejection based thereon is respectfully requested.

II. Rejection under 35 U.S.C. 103(a) over Wang et al. in view of Nakra et al.

Appellants respectfully submit that the rejection of claims 11-19 under 35 U.S.C. 103(a) over Wang in view of Nakra is erroneous for the reasons stated below and respectfully request reversal of this rejection.

A. Claims 11-13, 15, and 16

One aspect of Appellants' invention, as recited in new claim 11, is a "hybrid prediction method usable in parallel computing processors for predicting a value to be produced by an anticipated execution of an instruction." As recited in claim 11, the method includes "storing, in a first table, a current actual value ..., a current stride ..., and a stride history pattern for the instruction." The stride history pattern represents a pattern of strides that results from prior executions of the instruction, and the strides in this pattern of strides are stored in a stride field of the first table. The method also includes selecting a stride from the stride field of the first table and computing a predicted value for the anticipated execution of the instruction, using the stride from the selecting and the current actual value.

Appellants respectfully submit that Wang fails to teach or suggest multiple features recited in their claim 11. For example, the Final Office Action admits on page 5 that Wang does not teach or suggest the following aspects of the claimed invention:

> (1) "storing, in a first table, ... a current stride determined from the current actual value and a previous actual value produced by a prior execution of the instruction, and a stride history pattern for the instruction, the stride history pattern representing a pattern of strides resulting from prior executions of the instruction, wherein strides, including the current stride, of the pattern of strides are stored in a stride field of the first table;" (2) "selecting a stride from the stride field of the first table;" and (3)

> "computing a predicted value for the value to be produced by the anticipated execution of the instruction, the computing using the stride from the selecting and the current actual value, wherein the predicted value from the computing is equal to a prediction result from one of a last value prediction, a stride-based value prediction, and a stride-history-pattern-based value prediction."

The Final Office Action does not allege that Nakra teaches or suggests "storing, in a first table, … a stride history pattern for the instruction, the stride history pattern representing a pattern of strides resulting from prior executions of the instruction." Instead, the Final Office Action alleges that Nakra teaches the storage of a plurality of stride fields in table. However, appellants respectfully submit that storing, in a first table, a stride history pattern for the instruction is not the same as providing a plurality of stride fields in a table. A stride history pattern is a record of the most recent resulting stride values arranged in chronological order, or a representation thereof, whereas a plurality of stride fields in a table merely describes more than one storage location in table designated for storing stride data. That is, a stride history pattern is a collection of past stride values (i.e., data), whereas stride fields in a data table are memory locations where stride data are stored. On the bottom of page 5 to the top of page 6, the Final Office Action appears to acknowledge that the stride fields of Nakra store the following data: (1) the stride value resulting from the previous execution of the instruction and (2) the stride value that is currently selected for use in predicting the result of the anticipated execution of the instruction. In Nakra, the stride value currently selected for use in predicting the result of the anticipated execution of the instruction is updated when the same stride value is produced by consecutive executions of the instruction (bottom of column 2 on page 5 of Nakra). However, appellants respectfully submit that updating the stride value used for prediction according to this rule does not constitute storing a stride history pattern because the stride value used for prediction and the most recent stride need not have a particular relationship in time nor represent a particular sequence of outcomes produced by a series of executions of the instructions. This is

consistent with the position stated in the Final Office Action at the top of page 6 that Nakra merely stores these two stride values (the currently selected stride for prediction calculation and last stride value resulting from the last execution of the instruction (bottom of column 2, page 5 to the top of column 1, page 6 of Nakra)). The Final Office Action does not allege that Nakra teaches or suggests storing a stride history pattern.

Instead, as understood by appellants, the Final Office Action takes the position in the first full paragraph of page 6 that Nakra and Wang taken together provide the motivation for first modifying Wang and then combining the modification of Wang with Nakra by replacing an element in Nakra with the modification of Wang. Appellants respectfully submit that the effort required to obtain the proposed combination from the descriptions of Wang and Nakra far exceeds undue experimentation and strongly suggests that the Examiner has impermissibly used hindsight in view of appellants' disclosure to obtain the proposed combination. The Final Office Action states that Nakra (in the last paragraph of page 1) has taught that stride-based prediction has been shown to improve the prediction of the result of instruction execution compared to simple last value prediction and observes that the hybrid predictor of FIG. 6 in Wang uses last-value-type pattern prediction. Then the Final Office Action reasons that the performance improvement obtained using stride-based prediction compared to simple last value prediction would have motivated one of ordinary skill in the art to modify the last value pattern prediction method shown in FIG. 4 of Wang to store a stride history pattern instead of a value history pattern and to store the past strides, comprising the stride history pattern, in a field of the first table in Wang's "2-Level Value Predictor." The Final Office Action finally obtains the proposed combination by utilizing the last value table in FIG. 6 of Nakra together with the proposed modification of the "2-Level Value Predictor" in FIG. 4 of Wang.

Appellants traverse the purported motivation to modify Wang as proposed in the Final Office Action as well as the alleged motivation for modifying the stride-based predictor of Nakra to utilize the proposed modification of Wang in order to obtain the proposed combination. Appellants respectfully submit that one of ordinary skill in the art would not be motivated by

Nakra to make the proposed modification of Wang because the concluding statement of the paragraph cited in the Final Office Action as providing the motivation actually teaches away from the proposed modification. The last sentence of this paragraph appears at the top of col. 1 on page 2 of Nakra. In particular, Nakra states there that finite context method predictors, which utilize observed patterns of values, and hybrid predictors which employ context method prediction do not have efficient implementations due to their complexities. In fact, this paragraph specifically cites the hybrid predictor described in Wang, which utilizes two-level value prediction as shown in FIG. 4 of Wang. In light of these statements, appellants respectfully submit that one of ordinary skill in the art would not be motivated by Nakra to make the proposed modification of Wang. To the contrary, appellants respectfully submit that one of ordinary skill in the art would be dissuaded from making the modifications and combination proposed in the Final Office Action.

Moreover, appellants respectfully point out that although the authors of Wang were aware of the performance improvement of hybrid prediction utilizing simple stride-based prediction together with a type of value prediction (section 5.3 Experimental Results on pages 288-289 of Wang), they did not teach or suggest the proposed combination. Furthermore, Nakra was clearly written in view of Wang because Nakra explicitly references Wang. Although Nakra was written in view of Wang, Nakra also does not teach or suggest the modification of Wang proposed in the Final Office Action and proposed combination of the modification of Wang and Nakra.

Therefore, appellants respectfully submit that the claimed invention, as recited in claim 11, is not obvious in view of Wang and further in view of Nakra, and reversal of the rejection thereof is respectfully requested. The above arguments traversing the rejection of claim 11 apply by analogy to independent claim 16, which recites a hybrid prediction system. In addition, the arguments above regarding claim 11 also apply to dependent claims 12, 13, and 15 because these claims depend from claim 11. Therefore, appellants respectfully solicit reversal of the rejection of claims 11-13, 15, and 16 for all of the reasons stated above.

B. Claim 14

Claim 14 depends from claim 11 and recites additional features of the invention. For example, claim 14 includes "initializing a plurality of saturating counters in a stride pattern history table associated with the instruction such that the predicted value from the computing is equal to the prediction result obtained from the last value prediction" for a period before a stride history pattern is detected. This initialization occurs if an entry for the instruction is not found in a first table, which is recited in claim 11.

Neither Wang nor Nakra teach or suggest a plurality of counters in a stride pattern history table associated with the instruction. In the Final Office Action, it is alleged that the value pattern history table of Figure 4 in Wang operates as a stride pattern history table when the proposed modification of Wang is made. Although Wang is silent regarding the initialization of the pattern history table in Figure 4, the Final Office Action states that the initialization of counters in Wang's pattern history table is necessarily inherent. However, it is apparent from the bottom of column 2 on page 285 of Wang that the contents of Wang's pattern history table upon initialization affect the prediction result that would be produced by the modification and combination proposed in the Final Office Action. There, Wang states that the predictor of Figure 4 makes no prediction if none of the counts in the pattern history table exceeds a threshold. If the predictor of Figure 4 in Wang, which is modified as proposed in the Final Office Action, makes no prediction, then the proposed combination is not operable to produce a "predicted value ... equal to the prediction result obtained from the last value prediction" as recited in claim 14. The reason is that if the modified two-level (pattern) predictor of Wang makes no prediction, then its output is indeterminate. As a result, referring to Figure 6 of Nakra, it is apparent that the prediction produced by the proposed combination would be indeterminate because the indeterminate output of Wang's two-level (pattern) predictor would be added to a last value for the instruction, producing an indeterminate result.

Because there is no teaching or suggestion in Wang to initialize pattern history table of Figure 4 and no teaching or suggestion in either Wang or Nakra to further modify Wang so that the proposed combination initializes the counters in a stride pattern history table associated with the instruction such that the predicted value is equal to the prediction result obtained from last value prediction during the period before a stride history pattern is detected, appellants respectfully submit that rejection of claim 14 is erroneous. Therefore, appellants respectfully request reversal of the rejection of claim 14.

C. Claims 17-19

Claim 17 recites "[t]he hybrid prediction system according to claim 16 wherein the plurality of stride fields comprises a number of strides in a range, the range being greater than 3 and less than 7." The stride fields of an entry in the first table store the strides comprising a stride history pattern field of the entry. In accordance with the recitations of claim 17, the number of stride fields in an instruction's entry in the first table is a number from four to six, meaning that the stride history pattern field can comprise as many as four to six distinct strides, depending on the embodiment.

In contrast, Figures 3 and 6 of Wang show a table having one stride field for one stride value, and Figure 6 of Nakra shows a stride history table having two stride fields. Therefore, neither Wang nor Nakra teaches or suggests a hybrid instruction result prediction system having a first table in which an instruction entry includes between four and six stride fields. The Final Office Action reasons that because Wang illustrates four data value fields in Figure 4, it is obvious to modify Wang to include four stride fields instead for the reasons given with respect to the purposed modification of claim 11.

However, appellants respectfully submit that it would not be obvious to one of ordinary skill in the art that the proposed modification of Wang is operable for the intended purpose of predicting the output of an instruction with a hybrid predictor which utilizes a last value and a

stride selected from a detected pattern of strides to calculate a predicted instruction output. In particular, the Final Office Action provides no basis for the assumption that storing stride patterns consisting of four strides is sufficient to be operable for the intended objective. Appellants determined that it was advantageous to utilize between four and six stride fields for the prediction method of the present invention (paragraph [0034] of the specification). In contrast, section 3.1 of Wang entitled Data Value Locality (pages 283-284) reports on a statistical analysis of unique data values obtained from the execution of various instructions. This statistical data is the basis for Wang's choice of four data value fields (top of column 2 on page 285) for the two-level value (pattern) predictor shown in Figure 4 and described in section 3.3. Appellants respectfully submit that the respective prediction methods of the present invention and Wang are different, and therefore, the predictors of the present invention and Wang would be expected to perform differently. Indeed, experimental performance data reported in Wang (page 289) illustrates this point.

Therefore, appellants respectfully submit that it would not be obvious to one of ordinary skill in the art to modify Wang to include four stride fields, and it would certainly not be obvious to modify Wang to include either five or six stride fields. In addition, since claim 17 depends from claim 16, appellants respectfully submit that it would not have been obvious to one of ordinary skill in the art to make another modification of Wang and the proposed combination of Wang and Nakra as discussed hereinabove with respect claims 11 and 16. Thus, appellants respectfully submit that rejection of claim 17 in view of Wang and further in view of Nakra is erroneous for the reasons stated hereinabove with respect to claims 11 and 16 and for the additional reasons stated immediately above, and appellants respectfully request reversal of the rejection. Also, since claims 18 and 19 depend from claim 17 (directly and indirectly, respectively), rejection of claims 18 and 19 is erroneous for the same reasons as stated above for claim 17. Accordingly, appellant respectfully request reversal of the rejection of claims 18 and 19 as well as claim 17.

Conclusion

For all of the above reasons, appellants allege error in rejecting their claims as obvious over Wang and Nakra and in rejecting claims 11-15 as being indefinite. Accordingly, reversal of all rejections is respectfully requested.

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Appendix A

11. A hybrid prediction method usable in parallel computing processors for predicting a value to be produced by an anticipated execution of an instruction comprising:

storing, in a first table, a current actual value resulting from a most-recent execution of the instruction, a current stride determined from the current actual value and a previous actual value produced by a prior execution of the instruction, and a stride history pattern for the instruction, the stride history pattern representing a pattern of strides resulting from prior executions of the instruction, wherein strides, including the current stride, of the pattern of strides are stored in a stride field of the first table;

selecting a stride from the stride field of the first table; and

computing a predicted value for the value to be produced by the anticipated execution of the instruction, the computing using the stride from the selecting and the current actual value, wherein the predicted value from the computing is equal to a prediction result from one of a last value prediction, a stride-based value prediction, and a stride-history-pattern-based value prediction.

12. The method according to claim 11, wherein the method further comprises:

calculating the current stride as a difference between the current actual value and another actual value resulting from an execution of the instruction prior to the most-recent execution of the instruction; and

updating at least one counter of a plurality of saturating counters in a stride pattern history table according to the current stride, the plurality of saturating counters being associated with the stride history pattern.

13. The method according to claim 12, wherein:

the stride from the selecting corresponds to a counter having a count exceeding a threshold, the counter being one of the plurality of saturating counters in the stride pattern history table; and

the computing further comprises adding the current actual value and the stride from the selecting.

14. The method according to claim 11, wherein the method further comprises:

if an entry for the instruction from the storing is not found in the first table, initializing a plurality of saturating counters in a stride pattern history table associated with the instruction such that the predicted value from the computing is equal to the prediction result obtained from the last value prediction for a period before a comparison of the saturating counters to a threshold indicates detection of the stride history pattern; and

updating at least one of the plurality of saturating counters upon a subsequent occurrence of the stride history pattern resulting from one or more subsequent executions of the instruction.

15. The method according to claim 12, wherein the updating further comprises:

incrementing a counter of the plurality of saturating counters in the stride pattern history table, wherein the counter is associated with the current stride;

decrementing at least one other counter of the plurality of saturating counters in the stride pattern history table, wherein the at least one other counter is associated with another of the strides stored the stride field; and

wherein the stride from the selecting corresponds to one of the plurality of saturating counters having a greatest count if the greatest count exceeds a threshold, and signaling to indicate that the value to be produced by the anticipated execution of the instruction cannot be predicted if none of the plurality of saturating counters has a count exceeding the threshold.

16. A hybrid prediction system comprising:

a first table having at least one entry, each of the at least one entry comprising a current actual value resulting from a most-recent execution of an instruction, a plurality of stride fields, a stride history pattern field; and

a pattern history table for storing a plurality of counters associated with the stride fields of the first table, the pattern history table being arranged to be addressable by a two-table look-up mechanism using the stride history pattern field of the first table to select an entry in the pattern history table, wherein the counters are arranged for being updated according to occurrences of repeated stride patterns.

17. The hybrid prediction system according to claim 16 wherein the plurality of stride fields comprises a number of strides in a range, the range being greater than 3 and less than 7.

18. A sub-unit for use in microprocessor devices having at least one prediction system according to claim 17.

19. A microprocessor device having at least one sub-unit according to claim 18.